



PROPOSED RULE MAKING

(RCW 34.05.360)

CR-103 (710/97)

Agency: State Building Code Council

- Permanent Rule
- Emergency Rule
- Expedited Adoption
- Expedited Repeal

(1) Date of Adoption: June 14, 2002

(2) Purpose: To amend Chapter 51-11 WAC, the 2001 Washington State Energy Code, as relates to residential multi-unit buildings over five stories in height.

(3) Citation of existing rules affected by this order:

Repealed:

Amended: WAC 51-11, Sections 530, 533, 625 (Tables 5-1, 6-1 and 6-2)

Suspended:

(4) Statutory authority for adoption: RCW 19.27A.020, 19.27A.045, and RCW 19.27.020

Other authority:

PERMANENT RULE ONLY (Including EXPEDITED ADOPTION)

Adopted under notice filed as WSR on (date).

Describe any changed other than editing from proposed to adopted version:

EMERGENCY RULE ONLY

Under RCW 34.05.350 the agency for good cause finds:

- (a) That immediate adoption, amendment, or repeal of a rule is necessary for the preservation of the public health, safety, or general welfare, and that observing the time requirements of notice and opportunity to comment upon adoption of a permanent rule would be contrary to the public interest.
- (b) That state or federal law or federal rule or a federal deadline for state receipt of federal funds requires immediate adoption of a rule.

Reasons for this finding: See Attached

EXPEDITED REPEAL ONLY

Under Preproposal Statement of Inquiry filed as WSR on (date).

(5.3) Any other findings required by other provisions of law as precondition to adoption or effectiveness of rule?

Yes  No If Yes, explain:

(6) Effective date of rule:

CODE REVISER USE ONLY

Permanent Rules

Emergency Rules

or Expedited Rule Making

31 days after filing

Immediately

Other (specify): \*

Later (specify) July 1, 2002

\*(If less than 31 days after filing, specific finding in 5.3 under RCW 34.05.380(3) is required)

NAME (TYPE OR PRINT)

Jim Lewis

SIGNATURE

*Jim Lewis for Jim Lewis*

TITLE

Council Chair

DATE

June 14, 2002

CODE REVISER'S OFFICE  
STATE OF WASHINGTON

JUN 24 2002

403

TIME: 02:14:032 PM

WSR

(COMPLETE REVERSE SIDE)

**NOTE: If any category is left blank, it will be calculated as zero.**

**No descriptive text.**

**Count by whole WAC sections only, from the WAC number through the history note.  
A section may be counted in more than one category.**

**The number of sections adopted in order to comply with:**

<b>Federal statute:</b>	<b>New</b> _____	<b>Amended</b> _____	<b>Repealed</b> _____
<b>Federal rules or standards:</b>	<b>New</b> _____	<b>Amended</b> _____	<b>Repealed</b> _____
<b>Recently enacted state statutes:</b>	<b>New</b> _____	<b>Amended</b> _____	<b>Repealed</b> _____

**The number of sections adopted at the request of a nongovernment entity:**

**New** \_\_\_\_\_ **Amended** \_\_\_\_\_ **Repealed** \_\_\_\_\_

**The number of sections adopted on the agency's own initiative:**

**New** \_\_\_\_\_ **Amended** 3 \_\_\_\_\_ **Repealed** \_\_\_\_\_

**The number of sections adopted in order to clarify, streamline, or reform agency procedures:**

**New** \_\_\_\_\_ **Amended** 3 \_\_\_\_\_ **Repealed** \_\_\_\_\_

**The number of sections adopted using:**

<b>Negotiated rule making:</b>	<b>New</b> _____	<b>Amended</b> _____	<b>Repealed</b> _____
<b>Pilot rule making:</b>	<b>New</b> _____	<b>Amended</b> _____	<b>Repealed</b> _____
<b>Other alternative rule making:</b>	<b>New</b> _____	<b>Amended</b> <u>3</u> _____	<b>Repealed</b> _____

**DECLARATION OF EMERGENCY AND  
FINDINGS TO SUPPORT EMERGENCY RULEMAKING**

The State Building Code Council (Council), based on the following good cause, finds that an emergency affecting the general welfare of the state of Washington exists. The Council further finds that immediate amendment of a certain Council rule is necessary for the public welfare and that observing the time requirements of notice and opportunity to comment would be contrary to the public interest.

The declaration of emergency affecting the general welfare of the state of Washington is based on the following findings:

The Washington State Energy Code Table 5-1 and Tables 6-1 and 6-2 amendments contained herein as adopted by the Council under emergency rulemaking pursuant to RCW 34.05.350, will provide economic relief to multi-family residential builders or building owners by allowing the same thermal envelope requirements in effect since 1991. To conserve energy and provide relief from rising energy costs, in 2001 the State Building Code Council amended the residential building envelope requirements under their authority in RCW 19.27A.045. The Council simplified the code language by making the same thermal envelope requirements applicable to all buildings regardless of space heat source, with minor exceptions.

This change may have unanticipated consequences for residential buildings over five stories in height. The cost benefit analysis reviewed by the technical advisory group, and the Council did not include high rise buildings. The thermal envelope measures required for low rise buildings five stories and under were found to be cost effective. These same measures may not always result in an immediate energy savings benefit for buildings over five stories in height. This could ultimately result in undue expense for the building owner and occupants. The Council finds this may be an economic burden on the building and design industries, which could result in an increase in the cost of housing for high rise multi-family residential buildings including hotels, apartments and condominiums. Immediate adoption of this amendment is necessary so as to not delay the construction of high rise multi-family residential buildings, and so as not to adversely affect the state's building industry, building owners, and building tenants by possibly imposing an unanticipated economic penalty. The Council finds it should not impose the new standards on high rise multi-family buildings while an economic analysis is conducted. The amendment herein takes into consideration the general welfare of the public by reverting back to the previous Washington State Energy Code residential building envelope requirements for high rise residential. The Council also has taken the necessary steps to adopt a permanent rule. The permanent rule will not be effective until the end of the 2003 legislative session as per RCW 19.27.074.

**TABLE 5-1  
TARGET COMPONENT VALUES FOR GROUP R OCCUPANCY<sup>3</sup>**

Component	Climate Zone	
	1	2
Glazing % Floor Area	15%	15%
Vertical Glazing U-Factor	U = 0.400	U = 0.400
Overhead Glazing U-Factor	U = 0.58	U = 0.58
Doors	U = 0.200 (R-5)	U = 0.200 (R-5)
Ceilings		
Attic	U = 0.031 (R-38)	U = 0.031 (R-38)
Single Rafter/Joist Vaulted	U = 0.034 (R-30)	U = 0.034 (R-30)
Walls <sup>2</sup>		
Space Heat Type: Electric Resistance	U = 0.058 (R-19A)	U = 0.044 (R-19+R-5)
Other	U = 0.062 <sup>1</sup> (R-19)	U = 0.062 <sup>1</sup> (R-19)
Floors	U = 0.029 (R-30)	U = 0.029 (R-30)
Slab on Grade Slab R-Value	F = 0.54 (R-10)	F = 0.54 (R-10)
<b>Below Grade Interior</b>		
Wall R-Value	R-19	R-19
2' Depth: Walls Slab	U = 0.043 F = 0.69	U = 0.043 F = 0.69
3.5' Depth: Walls Slab	U = 0.041 F = 0.64	U = 0.041 F = 0.64
7' Depth: Walls Slab	U = 0.037 F = 0.57	U = 0.037 F = 0.57
<b>Below Grade Exterior</b>		
Wall R-Value	R-10	R-12
2' Depth: Walls Slab	U = 0.070 F = 0.60	U = 0.061 F = 0.60
3.5' Depth: Walls Slab	U = 0.064 F = 0.57	U = 0.057 F = 0.57
7' Depth: Walls Slab	U = 0.056 F = 0.42	U = 0.050 F = 0.42

1. Log and solid timber walls that have a minimum average thickness of 3.5" are exempt from wall target UA and proposed UA calculations.

2. "A" means advanced framing. For more information, see Section 1005.2.

3. For Group R-1 Occupancy buildings over five stories, see Table 5-1A.

((Table 5-4 - Reserved))

**TABLE 5-1A**  
**TARGET COMPONENT VALUES**  
**FOR GROUP R-1 OCCUPANCY, BUILDINGS OVER 5 STORIES**

Component	Electric Resistance		Other Fuels	
	Climate Zone		Climate Zone	
	1	2	1	2
Glazing % Floor Area	15%	15%	15%	15%
Vertical Glazing U-Factor	U = 0.400	U = 0.400	U = 0.650	U = 0.600
Overhead Glazing U-Factor	U = 0.58	U = 0.58	U = 0.68	U = 0.64
Doors	U = 0.200 (R-5)	U = 0.200 (R-5)	U = 0.400 (R-2.5)	U = 0.400 (R-2.5)
Ceilings				
Attic	U = 0.031 (R-38)	U = 0.031 (R-38)	U = 0.036 (R-30)	U = 0.031 (R-38)
Single Rafter/Joist Vaulted	U = 0.034 (R-30)	U = 0.034 (R-30)	U = 0.034 (R-30)	U = 0.034 (R-30)
Walls <sup>2</sup>	U = 0.058 (R-19A)	U = 0.044 (R-19+5A)	U = 0.062 <sup>1</sup> (R-19)	U = 0.062 <sup>1</sup> (R-19)
Floors	U = 0.029 (R-30)	U = 0.029 (R-30)	U = 0.041 (R-19)	U = 0.029 (R-30)
Slab on Grade	F = 0.54	F = 0.54	F = 0.54	F = 0.54
Slab R-Value	(R-10)	(R-10)	(R-10)	(R-10)
<b>Below Grade Interior</b>				
Wall R-Value	R-19	R-19	R-19	R-19
2' Depth: Walls	U = 0.043	U = 0.043	U = 0.043	U = 0.043
Slab	F = 0.69	F = 0.69	F = 0.69	F = 0.69
3.5' Depth: Walls	U = 0.041	U = 0.041	U = 0.041	U = 0.041
Slab	F = 0.64	F = 0.64	F = 0.64	F = 0.64
7' Depth: Walls	U = 0.037	U = 0.037	U = 0.037	U = 0.037
Slab	F = 0.57	F = 0.57	F = 0.57	F = 0.57
<b>Below Grade Exterior</b>				
Wall R-Value	R-10	R-12	R-10	R-12
2' Depth: Walls	U = 0.070	U = 0.061	U = 0.070	U = 0.061
Slab	F = 0.60	F = 0.60	F = 0.60	F = 0.60
3.5' Depth: Walls	U = 0.064	U = 0.057	U = 0.064	U = 0.057
Slab	F = 0.57	F = 0.57	F = 0.57	F = 0.57
7' Depth: Walls	U = 0.056	U = 0.050	U = 0.056	U = 0.050
Slab	F = 0.42	F = 0.42	F = 0.42	F = 0.42

1. Log and Solid Timber walls that have a minimum average thickness of 3.5" are exempt from wall target UA and proposed UA calculations.
2. "A" means advanced framing. For more information, see Section 1005.2.



**TABLE 6-1  
PRESCRIPTIVE REQUIREMENTS<sup>0,1</sup> FOR GROUP R OCCUPANCY<sup>13</sup>  
CLIMATE ZONE 1**

Option	Glazing Area <sup>10</sup> : % of Floor	Glazing U-Factor		Door <sup>9</sup> U-Factor	Ceiling <sup>2</sup>	Vaulted Ceiling <sup>3</sup>	Wall Above Grade <sup>12</sup>	Wall• int <sup>4</sup> Below Grade	Wall• ext <sup>4</sup> Below Grade	Floor <sup>5</sup>	Slab <sup>4</sup> on Grade
		Vertical	Overhead <sup>11</sup>								
I.	12%	0.35	0.58	0.20	R-38	R-30	R-15	R-15	R-10	R-30	R-10
II.*	15%	0.40	0.58	0.20	R-38	R-30	R-21	R-21	R-10	R-30	R-10
III.	Unlimited Group R-3 Occupancy Only	0.40	0.58	0.20	R-38	R-30	R-21	R-21	R-10	R-30	R-10

\* Reference Case

0. Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 13%, it shall comply with all of the requirements of the 15% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.

2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings. 'Adv' denotes Advanced Framed Ceiling.

3. Requirement applicable only to single rafter or joist vaulted ceilings.

4. Below grade walls shall be insulated either on the exterior to a minimum level of R-10, or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.

5. Floors over crawl spaces or exposed to ambient air conditions.

6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4.

7. Int. denotes standard framing 16 inches on center with headers insulated with a minimum of R-5 insulation.

8. This wall insulation requirement denotes R-19 wall cavity insulation plus R-5 foam sheathing.

9. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.

10. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U=0.40 or less is not included in glazing area limitations.

11. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.

12. Log and solid timber walls with a minimum average thickness of 3.5" are exempt from this insulation requirement.

13. For Group R Occupancy buildings over five stories, see Table 6-1A and Table 6-1B.

**TABLE 6-1A**  
**PRESCRIPTIVE REQUIREMENTS<sup>1\*\*</sup>**  
**FOR GROUP R-1 OCCUPANCY BUILDINGS OVER 5 STORIES**  
**CLIMATE ZONE 1 • HEATING BY ELECTRIC RESISTANCE**

Option	Glazing Area <sup>10</sup> : % of Floor	Glazing U-Factor		Door <sup>9</sup> U-Factor	Ceiling <sup>2</sup>	Vaulted Ceiling <sup>3</sup>	Wall Above Grade	Wall <sup>•</sup> int <sup>4</sup> Below Grade	Wall <sup>•</sup> ext <sup>4</sup> Below Grade	Floor <sup>5</sup>	Slab <sup>4</sup> on Grade
		Vertical	Overhead <sup>11</sup>								
<b>I.</b>	10%	0.46	0.58	0.40	R-38	R-30	R-21	R-21	R-10	R-30	R-10
<b>II.</b>	12%	0.43	0.58	0.20	R-38	R-30	R-19	R-19	R-10	R-30	R-10
<b>III.</b>	12%	0.40	0.58	0.40	R-38	R-30	R-21	R-21	R-10	R-30	R-10
<b>IV.*</b>	15%	0.40	0.58	0.20	R-38	R-30	R-19	R-19	R-10	R-30	R-10
<b>V.</b>	18%	0.39	0.58	0.20	R-38	R-30	R-21	R-21	R-10	R-30	R-10
<b>VI.</b>	21%	0.36	0.58	0.20	R-38	R-30	R-21	R-21	R-10	R-30	R-10
<b>VII.<sup>7</sup></b>	25%	0.32 <sup>7</sup>	0.58	0.20	R-38	R-30	R-19 +R-5 <sup>8</sup>	R-21	R-10	R-30	R-10
<b>VIII.<sup>7</sup></b>	30%	0.29 <sup>7</sup>	0.58	0.20	R-38	R-30	R-19 +R-5 <sup>8</sup>	R-21	R-10	R-30	R-10

\* Reference Case

\*\* Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 19%, it shall comply with all of the requirements of the 21% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.
2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings. 'Adv' denotes Advanced Framed Ceiling.
3. Requirement applicable only to single rafter or joist vaulted ceilings.
4. Below grade walls shall be insulated either on the exterior to a minimum level of R-10, or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.
5. Floors over crawl spaces or exposed to ambient air conditions.
6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4.
7. Reserved.
8. This wall insulation requirement denotes R-19 wall cavity insulation plus R-5 foam sheathing.
9. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.
10. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U=0.40 or less is not included in glazing area limitations.
11. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.

**TABLE 6-1B**  
**PRESCRIPTIVE REQUIREMENTS<sup>1\*\*</sup>**  
**FOR GROUP R-1 OCCUPANCY BUILDINGS OVER 5 STORIES**  
**CLIMATE ZONE 1 • HEATING BY OTHER FUELS**

Option	HVAC <sup>9</sup> Equip. Effic.	Glazing Area <sup>11</sup> : % of Floor	Glazing U-Factor		Door <sup>10</sup> U-Factor	Ceiling <sup>2</sup>	Vaulted Ceiling <sup>3</sup>	Wall Above Grade	Wall <sup>•</sup> int <sup>4</sup> Below Grade	Wall <sup>•</sup> ext <sup>4</sup> Below Grade	Floor <sup>5</sup>	Slab <sup>6</sup> on Grade
			Vertical	Overhead <sup>12</sup>								
<b>I.</b>	Med.	10%	0.70	0.68	0.40	R-30	R-30	R-15	R-15	R-10	R-19	R-10
<b>II.</b>	Med.	12%	0.65	0.68	0.40	R-30	R-30	R-15	R-15	R-10	R-19	R-10
<b>III.</b>	High	21%	0.75	0.68	0.40	R-30	R-30	R-19	R-19	R-10	R-19	R-10
<b>IV.*</b>	Med.	21%	0.65	0.68	0.40	R-30	R-30	R-19	R-19	R-10	R-19	R-10
<b>V.</b>	Low	21%	0.60	0.68	0.40	R-30	R-30	R-19	R-19	R-10	R-19	R-10
<b>VI.<sup>7</sup></b>	Med.	25%	0.45 <sup>7</sup>	0.68	0.40	R-38	R-30	R-19	R-19	R-10	R-25	R-10
<b>VII.<sup>7</sup></b>	Med.	30%	0.40 <sup>7</sup>	0.68	0.40	R-30	R-30	R-19	R-19	R-10	R-25	R-10
<b>VIII.</b>	Med.	unlimited	0.25	0.40	0.40	R-30	R-30	R-19	R-19	R-10	R-25	R-10

\* Reference Case

\*\* Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 19%, it shall comply with all of the requirements of the 21% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.
2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings. 'Adv' denotes Advanced Framed Ceiling.
3. Requirement applicable only to single rafter or joist vaulted ceilings.
4. Below grade walls shall be insulated either on the exterior to a minimum level of R-10, or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.
5. Floors over crawl spaces or exposed to ambient air conditions.
6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4.
7. Reserved.
8. Reserved.
9. Minimum HVAC equipment efficiency requirement. 'Low' denotes an AFUE of 0.74. 'Med.' denotes an AFUE of 0.78. 'High' denotes an AFUE of 0.88. Minimum HVAC equipment efficiency requirement for heat pumps. 'Low' denotes an HSPF of 6.35. 'Med.' denotes an HSPF of 6.8. 'High' an HSPF of 7.7. Water and ground source heat pumps shall be considered as medium efficiency and have a minimum COP as required in Table 5-7 14-1B.
10. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.
11. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U=0.40 or less is not included in glazing area limitations.
12. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.



**TABLE 6-2  
PRESCRIPTIVE REQUIREMENT S<sup>0,1</sup> FOR GROUP R OCCUPANCY<sup>13</sup>  
CLIMATE ZONE 2**

Option	Glazing Area <sup>10</sup> : % of Floor	Glazing U-Factor		Door <sup>9</sup> U-Factor	Ceiling <sup>2</sup>	Vaulted Ceiling <sup>3</sup>	Wall Above Grade <sup>12</sup>	Wall• int <sup>4</sup> Below Grade	Wall• ext <sup>4</sup> Below Grade	Floor <sup>5</sup>	Slab <sup>4</sup> on Grade
		Vertical	Overhead <sup>11</sup>								
I.	10%	0.40	0.58	0.20	R-38	R-30	R-21 int <sup>7</sup>	R-21	R-12	R-30	R-10
II.*	15%	0.40	0.58	0.20	R-38	R-30	R-19 + R-5 <sup>8</sup>	R-21	R-12	R-30	R-10
III.	17%	0.37	0.58	0.20	R-38	R-30	R-19 + R-5 <sup>8</sup>	R-21	R-12	R-30	R-10
IV.	Unlimited Group R-3 Occupancy Only	0.35	0.58	0.20	R-38	R-30	R-21 int <sup>7</sup>	R-21	R-12	R-30	R-10

\* Reference Case

0. Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 13%, it shall comply with all of the requirements of the 15% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.

2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings. 'Adv' denotes Advanced Framed Ceiling.

3. Requirement applicable only to single rafter or joist vaulted ceilings.

4. Below grade walls shall be insulated either on the exterior to a minimum level of R-10, or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.

5. Floors over crawl spaces or exposed to ambient air conditions.

6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4.

7. Int. denotes standard framing 16 inches on center with headers insulated with a minimum of R-5 insulation.

8. This wall insulation requirement denotes R-19 wall cavity insulation plus R-5 foam sheathing.

9. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.

10. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U=0.40 or less is not included in glazing area limitations.

11. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.

12. Log and solid timber walls with a minimum average thickness of 3.5" are exempt from this insulation requirement.

13. For Group R Occupancy buildings over five stories, see Table 6-2A and Table 6-2B.

**TABLE 6-2A**  
**PRESCRIPTIVE REQUIREMENTS<sup>1\*\*</sup>**  
**FOR GROUP R-1 OCCUPANCY BUILDINGS OVER 5 STORIES**  
**CLIMATE ZONE 2 • HEATING BY ELECTRIC RESISTANCE**

Option	Glazing Area <sup>11</sup> : % of Floor	Glazing U-Factor		Door <sup>10</sup> U-Factor	Ceiling <sup>2</sup>	Vaulted Ceiling <sup>3</sup>	Wall Above Grade	Wall <sup>•</sup> int <sup>4</sup> Below Grade	Wall <sup>•</sup> ext <sup>4</sup> Below Grade	Floor <sup>5</sup>	Slab <sup>6</sup> on Grade
		Vertical	Overhead <sup>12</sup>								
<b>I.</b>	10%	0.38	0.58	0.20	R-38	R-30	R-21	R-21	R-12	R-30	R-10
<b>II.</b>	12%	0.40	0.58	0.20	R-38	R-30	R-19+R-5 <sup>8</sup>	R-21	R-12	R-25	R-10
<b>III.*</b>	15%	0.40	0.58	0.20	R-38	R-30	R-19+R-5 <sup>8</sup>	R-21	R-12	R-30	R-10
<b>IV.</b>	18%	0.38	0.58	0.20	R-38	R-30	R-19+R-5 <sup>8</sup>	R-21	R-12	R-30	R-10
<b>V.</b>	21%	0.35	0.58	0.20	R-38Adv	R-38	R-19+R-5 <sup>8</sup>	R-21	R-12	R-30	R-10
<b>VI.<sup>7</sup></b>	25%	0.30 <sup>7</sup>	0.58	0.20	R-49Adv	R-38	R-19+R-5 <sup>8</sup>	R-21	R-12	R-30	R-10
<b>VII.<sup>7</sup></b>	30%	0.28 <sup>7</sup>	0.58	0.20	R-60Adv	R-38	R-21+R-7.5 <sup>9</sup>	R-21	R-12	R-30	R-10

\* Reference Case

\*\* Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 19%, it shall comply with all of the requirements of the 21% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.
2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings. 'Adv' denotes Advanced Framed Ceiling.
3. Requirement applicable only to single rafter or joist vaulted ceilings.
4. Below grade walls shall be insulated either on the exterior to a minimum level of R-12, or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.
5. Floors over crawl spaces or exposed to ambient air conditions.
6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4.
7. Reserved.
8. This wall insulation requirement denotes R-19 wall cavity insulation plus R-5 foam sheathing.
9. This wall insulation requirement denotes R-21 wall cavity insulation plus R-7.5 foam sheathing.
10. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.
11. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U=0.40 or less is not included in glazing area limitations.
12. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.

**TABLE 6-2B**  
**PRESCRIPTIVE REQUIREMENTS<sup>1\*\*</sup>**  
**FOR GROUP R-1 OCCUPANCY BUILDINGS OVER 5 STORIES**  
**CLIMATE ZONE 2 • HEATING BY OTHER FUELS**

Option	HVAC <sup>a</sup> Equip. Effic.	Glazing Area <sup>11</sup> :% of Floor	Glazing U-Factor		Door <sup>10</sup> U-Factor	Ceiling <sup>2</sup>	Vaulted Ceiling <sup>3</sup>	Wall Above Grade	Wall• int <sup>4</sup> Below Grade	Wall• ext <sup>4</sup> Below Grade	Floor <sup>5</sup>	Slab <sup>6</sup> on Grade
			Vertical	Overhead <sup>12</sup>								
<b>I.</b>	Med.	10%	0.70	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-25	R-10
<b>II.</b>	Med.	12%	0.65	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-25	R-10
<b>III.</b>	High	17%	0.65	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-25	R-10
<b>IV.*</b>	Med.	17%	0.60	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-30	R-10
<b>V.</b>	Low	17%	0.50	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-30	R-10
<b>VI.</b>	Med.	21%	0.50	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-30	R-10
<b>VII.<sup>7</sup></b>	Med.	25%	0.40 <sup>7</sup>	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-30	R-10
<b>VIII.<sup>7</sup></b>	Med.	30%	0.40 <sup>7</sup>	0.64	0.40	R-38	R-30	R-19	R-19	R-12	R-30	R-10
<b>IX.</b>	Med.	unlimited	0.25	0.40	0.40	R-38	R-30	R-19	R-19	R-12	R-30	R-10

\* Reference Case

\*\* Nominal R-values are for wood frame assemblies only or assemblies built in accordance with Section 601.1.

1. Minimum requirements for each option listed. For example, if a proposed design has a glazing ratio to the conditioned floor area of 19%, it shall comply with all of the requirements of the 21% glazing option (or higher). Proposed designs which cannot meet the specific requirements of a listed option above may calculate compliance by Chapters 4 or 5 of this Code.
2. Requirement applies to all ceilings except single rafter or joist vaulted ceilings. 'Adv' denotes Advanced Framed Ceiling.
3. Requirement applicable only to single rafter or joist vaulted ceilings.
4. Below grade walls shall be insulated either on the exterior to a minimum level of R-12, or on the interior to the same level as walls above grade. Exterior insulation installed on below grade walls shall be a water resistant material, manufactured for its intended use, and installed according to the manufacturer's specifications. See Section 602.2.
5. Floors over crawl spaces or exposed to ambient air conditions.
6. Required slab perimeter insulation shall be a water resistant material, manufactured for its intended use, and installed according to manufacturer's specifications. See Section 602.4.
7. Reserved.
8. Reserved.
9. Minimum HVAC equipment efficiency requirement. 'Low' denotes an AFUE of 0.74. 'Med.' denotes an AFUE of 0.78. 'High' denotes an AFUE of 0.88. Minimum HVAC equipment efficiency requirement for heat pumps. 'Low' denotes an HSPF of 6.35. 'Med.' denotes an HSPF of 6.8. 'High' an HSPF of 7.7. Water and ground source heat pumps shall be considered as medium efficiency and have a minimum COP as required in Table 14-1B.
10. Doors, including all fire doors, shall be assigned default U-factors from Table 10-6C.
11. Where a maximum glazing area is listed, the total glazing area (combined vertical plus overhead) as a percent of gross conditioned floor area shall be less than or equal to that value. Overhead glazing with U-factor of U=0.40 or less is not included in glazing area limitations.
12. Overhead glazing shall have U-factors determined in accordance with NFRC 100 or as specified in Section 502.1.5.